

ALTERNATING PHASE SHIFT MASK DESIGN WITH OPTIMIZED PHASE SHAPES

ABSTRACT

5 A method is described for designing an alternating phase
shifted mask (altPSM) by optimally selecting the width of phase
shapes. The selection of optimal phase shape widths is achieved
by providing a lithography metric that describes the relationship
between phase shape width and the target image dimension such
that the metric, such as process window or across chip linewidth
10 variation (ACLV), is optimized. In a preferred embodiment, ACLV
is computed by Monte Carlo simulation by providing a set of error
distributions for lithographic parameters such as focus, dose,
lens aberrations, and the like. Alternatively, a lookup table of
optimal phase widths associated with target image dimensions may
15 be provided. The resulting altPSM is characterized by phase
shapes having widths that vary according to the widths of the
target image dimensions.

FOOTNOTES